

SEQUENCE LISTING

<110> CASTANIA Sociedade Agroflorestal SA

<120> *Castanea sativa* Mill. genes codifying for Allene Oxide Cyclase, Cystatin, β -1,3-Glucanase and Thaumatin-Like Protein and their use

<130> 1

<140>

<141> 2004-06-07

<150> PT 102979-S
<151> 2003-06-26

<160> 8

<170> PatentIn version 3.1

<210> 1

<211> 735

<212> DNA

<213> Castanea sativa

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48

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tcc tca tcc aag cta tct tct gcc ttc caa act aaa aag atc caa tct
Ser Ser Ser Lys Leu Ser Ser Ala Phe Gln Thr Lys Lys Ile Gln Ser
20          25          30

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96

ttt aaa cta cct aac cct ctc att tct cag aat cat aaa ctt act acc

144

Phe Lys Leu Pro Asn Pro Leu Ile Ser Gln Asn His Lys Leu Thr Thr			
35	40	45	
acc tct act act gct tcc aga tca ttt tcc tgc aag agc cag agc acc			192
Thr Ser Thr Thr Ala Ser Arg Ser Phe Ser Cys Lys Ser Gln Ser Thr			
50	55	60	
tca aca gat tca act aac act gaa gtt caa gaa ctt agt gtc tat gag			240
Ser Thr Asp Ser Thr Asn Thr Glu Val Gln Glu Leu Ser Val Tyr Glu			
65	70	75	80
atc aat gaa cgt gat cgt gga agc cct gct tat ctt cga ttg agc caa			288
Ile Asn Glu Arg Asp Arg Gly Ser Pro Ala Tyr Leu Arg Leu Ser Gln			
85	90	95	
aag act gtt aat tca ctc gga gat ctt gtc ccc ttt agc aac aag cta			336
Lys Thr Val Asn Ser Leu Gly Asp Leu Val Pro Phe Ser Asn Lys Leu			
100	105	110	
tat act gca gat cta aag aag aga att gga ata aca gca gga ctc tgc			384
Tyr Thr Ala Asp Leu Lys Lys Arg Ile Gly Ile Thr Ala Gly Leu Cys			
115	120	125	
att ctg atc aag cac gaa gaa gag aag aaa gga gat cgc tat gaa gct			432
Ile Leu Ile Lys His Glu Glu Lys Lys Gly Asp Arg Tyr Glu Ala			
130	135	140	
gtt tac agc ttc tac ttc ggc gat tac ggt cat atc gcc gtt cag gga			480
Val Tyr Ser Phe Tyr Phe Gly Asp Tyr Gly His Ile Ala Val Gln Gly			
145	150	155	160
gcg tac tta acc tat gaa gaa act tac cta gcc gtc acc ggt gga tcc			528
Ala Tyr Leu Thr Tyr Glu Glu Thr Tyr Leu Ala Val Thr Gly Gly Ser			
165	170	175	
ggc ata ttt gca ggg gtt tcc ggt caa gtg aaa ttg cag caa ctc att			576
Gly Ile Phe Ala Gly Val Ser Gly Gln Val Lys Leu Gln Gln Leu Ile			
180	185	190	
ttc cct ttc aag cta ttt tac act ttt tac ttg aag ggg atc ccc ggt			624
Phe Pro Phe Lys Leu Phe Tyr Thr Phe Tyr Leu Lys Gly Ile Pro Gly			
195	200	205	
ctg cca tct gaa ttg ttg tgt acg gcg gtt cct ccg tcg ccg acg gtg			672
Leu Pro Ser Glu Leu Leu Cys Thr Ala Val Pro Pro Ser Pro Thr Val			
210	215	220	
gag cca aca cct gaa gct aaa gct tgt gag gaa ggg gcc gca ctg aaa			720
Glu Pro Thr Pro Glu Ala Lys Ala Cys Glu Glu Gly Ala Ala Leu Lys			
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Asn Tyr Thr Asn			

<211> 244

<212> PRT

<213> Castanea sativa

<400> 2

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Phe Lys Leu Pro Asn Pro Leu Ile Ser Gln Asn His Lys Leu Thr Thr
35 40 45

Thr Ser Thr Thr Ala Ser Arg Ser Phe Ser Cys Lys Ser Gln Ser Thr
50 55 60

Ser Thr Asp Ser Thr Asn Thr Glu Val Gln Glu Leu Ser Val Tyr Glu
65 70 75 80

Ile Asn Glu Arg Asp Arg Gly Ser Pro Ala Tyr Leu Arg Leu Ser Gln
85 90 95

Lys Thr Val Asn Ser Leu Gly Asp Leu Val Pro Phe Ser Asn Lys Leu
100 105 110

Tyr Thr Ala Asp Leu Lys Lys Arg Ile Gly Ile Thr Ala Gly Leu Cys
115 120 125

Ile Leu Ile Lys His Glu Glu Lys Lys Gly Asp Arg Tyr Glu Ala
130 135 140

Val Tyr Ser Phe Tyr Phe Gly Asp Tyr Gly His Ile Ala Val Gln Gly
145 150 155 160

Ala Tyr Leu Thr Tyr Glu Glu Thr Tyr Leu Ala Val Thr Gly Gly Ser
165 170 175

Gly Ile Phe Ala Gly Val Ser Gly Gln Val Lys Leu Gln Gln Leu Ile
180 185 190

Phe Pro Phe Lys Leu Phe Tyr Thr Phe Tyr Leu Lys Gly Ile Pro Gly
195 200 205

Leu Pro Ser Glu Leu Leu Cys Thr Ala Val Pro Pro Ser Pro Thr Val
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Asn Tyr Thr Asn

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<212> DNA

<213> Castanea sativa

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cat gag aac agc ttg cag atc gac gac ctc gct cgt ttt gct gtc gac 96
His Glu Asn Ser Leu Gln Ile Asp Asp Leu Ala Arg Phe Ala Val Asp
20 25 30

gac cac aac aag aaa gcg aat aca ctg ctg cag ttt aag aag gtg gtg 144
Asp His Asn Lys Lys Ala Asn Thr Leu Leu Gln Phe Lys Lys Val Val
35 40 45

aat gcg aaa cag cag gtg gtt tct gga aca ata tac att cta acg ttg 192
Asn Ala Lys Gln Gln Val Val Ser Gly Thr Ile Tyr Ile Leu Thr Leu
50 55 60

gag gtg gag gat ggc ggg aag aag aaa gtt tat gaa gcc aag att tgg 240
Glu Val Glu Asp Gly Gly Lys Lys Val Tyr Glu Ala Lys Ile Trp
65 70 75 80

gag aag cca tgg ttg aac ttc aag gag gtg cag gaa ttt aag ctc att 288
Glu Lys Pro Trp Leu Asn Phe Lys Glu Val Gln Glu Phe Lys Leu Ile
85 90 95

ggg gat gcc cct aca cac cat agt gct taa 318
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<213> Castanea sativa

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20 25 30

Asp His Asn Lys Lys Ala Asn Thr Leu Leu Gln Phe Lys Lys Val Val
35 40 45

Asn Ala Lys Gln Gln Val Val Ser Gly Thr Ile Tyr Ile Leu Thr Leu
50 55 60

Glu Val Glu Asp Gly Gly Lys Lys Val Tyr Glu Ala Lys Ile Trp
65 70 75 80

Glu Lys Pro Trp Leu Asn Phe Lys Glu Val Gln Glu Phe Lys Leu Ile
85 90 95

Gly Asp Ala Pro Thr His His Ser Ala
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<212> DNA

<213> Castanea sativa

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tct aac att gaa gtc atg cta ggt gtc cca aac tca gac ctt caa agc Ser Asn Ile Glu Val Met Leu Gly Val Pro Asn Ser Asp Leu Gln Ser	20	25	30	96	
ctt gcc aac cct tcc aat gca caa gca tgg gta caa aga aac gta ctt Leu Ala Asn Pro Ser Asn Ala Gln Ala Trp Val Gln Arg Asn Val Leu	35	40	45	144	
aac ttc tgg cct agt gtc agg ttt cga tac att gca gtt gga aat gaa Asn Phe Trp Pro Ser Val Arg Phe Arg Tyr Ile Ala Val Gly Asn Glu	50	55	60	192	
gtg agt cct gtt aat gga ggc aca gct ggg tta gca caa att gtt ctc Val Ser Pro Val Asn Gly Gly Thr Ala Gly Leu Ala Gln Ile Val Leu	65	70	75	80	240
cct gcc tta acc aac gta ttc aat gca att aga tca gct ggc ctt aag Pro Ala Leu Thr Asn Val Phe Asn Ala Ile Arg Ser Ala Gly Leu Lys	85	90	95	288	
gac caa atc cag gtt tca att gca att gac atg acc tta ata gga aac Asp Gln Ile Gln Val Ser Ile Ala Ile Asp Met Thr Leu Ile Gly Asn	100	105	110	336	
tcc tat cct ccg tca gca ggg gct ttc aga ggt gat gtt aga tca tat Ser Tyr Pro Pro Ser Ala Gly Ala Phe Arg Gly Asp Val Arg Ser Tyr	115	120	125	384	
tta gac cca atc att ggt cac cta gta tat gct aag gca ccc tta cta Leu Asp Pro Ile Ile Gly His Leu Val Tyr Ala Lys Ala Pro Leu Leu	130	135	140	432	
gcc aat gtg tac act tat ttt agc tat gct gga aat cca cgc gac att Ala Asn Val Tyr Thr Tyr Phe Ser Tyr Ala Gly Asn Pro Arg Asp Ile	145	150	155	160	480
tct ctt ccc tat gct ttg ttt act tcc cca tca gtt gtg gca tgg gat Ser Leu Pro Tyr Ala Leu Phe Thr Ser Pro Ser Val Val Ala Trp Asp	165	170	175	528	
ggc cct aag gga tac caa aac ctt ttt gat gca atg atg gat gca ttg Gly Pro Lys Gly Tyr Gln Asn Leu Phe Asp Ala Met Met Asp Ala Leu	180	185	190	576	
tac tca gct ctc gag agg tcg tgg ggc ggt tca ttg gag gtt gtt gtt Tyr Ser Ala Leu Glu Arg Ser Trp Gly Gly Ser Leu Glu Val Val Val	195	200	205	624	
tca gag agt gga tgg cca tca gca gca ggt gga ttc gct aca tca ttt Ser Glu Ser Gly Trp Pro Ser Ala Ala Gly Gly Phe Ala Thr Ser Phe	210	215	220	672	
gat aat gca cgt act tat tac tca aat ttg att aag cat gtc aaa ggg Asp Asn Ala Arg Thr Tyr Tyr Ser Asn Leu Ile Lys His Val Lys Gly	225	230	235	240	720

ggt aca cca aag agg cct ggg gga gct ata gag acc tat ctt ttt gcc		768
Gly Thr Pro Lys Arg Pro Gly Gly Ala Ile Glu Thr Tyr Leu Phe Ala		
245	250	255
atg ttt aat gag aat cag aaa caa cca gag cta gag aaa aac ttt ggc		816
Met Phe Asn Glu Asn Gln Lys Gln Pro Glu Leu Glu Lys Asn Phe Gly		
260	265	270
tta ttc ttc cca aat aaa cag ccc aaa ttt aac ctc aat ttt ggt gga		864
Leu Phe Phe Pro Asn Lys Gln Pro Lys Phe Asn Leu Asn Phe Gly Gly		
275	280	285
gaa aga atc tgg gat gtc act gct gaa tat aat gca aca gtt tcc ctc		912
Glu Arg Ile Trp Asp Val Thr Ala Glu Tyr Asn Ala Thr Val Ser Leu		
290	295	300
agt agt gat atg taa		927
Ser Ser Asp Met		
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<210> 6

<211> 308

<212> PRT

<213> Castanea sativa

<400> 6

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Ser Asn Ile Glu Val Met Leu Gly Val Pro Asn Ser Asp Leu Gln Ser		
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Leu Ala Asn Pro Ser Asn Ala Gln Ala Trp Val Gln Arg Asn Val Leu		
35	40	45

Asn Phe Trp Pro Ser Val Arg Phe Arg Tyr Ile Ala Val Gly Asn Glu		
50	55	60

Val Ser Pro Val Asn Gly Gly Thr Ala Gly Leu Ala Gln Ile Val Leu		
65	70	75
		80

Pro Ala Leu Thr Asn Val Phe Asn Ala Ile Arg Ser Ala Gly Leu Lys		
85	90	95

Asp Gln Ile Gln Val Ser Ile Ala Ile Asp Met Thr Leu Ile Gly Asn
100 105 110

Ser Tyr Pro Pro Ser Ala Gly Ala Phe Arg Gly Asp Val Arg Ser Tyr
115 120 125

Leu Asp Pro Ile Ile Gly His Leu Val Tyr Ala Lys Ala Pro Leu Leu
130 135 140

Ala Asn Val Tyr Thr Tyr Phe Ser Tyr Ala Gly Asn Pro Arg Asp Ile
145 150 155 160

Ser Leu Pro Tyr Ala Leu Phe Thr Ser Pro Ser Val Val Ala Trp Asp
165 170 175

Gly Pro Lys Gly Tyr Gln Asn Leu Phe Asp Ala Met Met Asp Ala Leu
180 185 190

Tyr Ser Ala Leu Glu Arg Ser Trp Gly Gly Ser Leu Glu Val Val Val
195 200 205

Ser Glu Ser Gly Trp Pro Ser Ala Ala Gly Gly Phe Ala Thr Ser Phe
210 215 220

Asp Asn Ala Arg Thr Tyr Tyr Ser Asn Leu Ile Lys His Val Lys Gly
225 230 235 240

Gly Thr Pro Lys Arg Pro Gly Gly Ala Ile Glu Thr Tyr Leu Phe Ala
245 250 255

Met Phe Asn Glu Asn Gln Lys Gln Pro Glu Leu Glu Lys Asn Phe Gly
260 265 270

Leu Phe Phe Pro Asn Lys Gln Pro Lys Phe Asn Leu Asn Phe Gly Gly
275 280 285

Glu Arg Ile Trp Asp Val Thr Ala Glu Tyr Asn Ala Thr Val Ser Leu
290 295 300

Ser Ser Asp Met
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<210> 7
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tct ggt gca cac tct gct aaa ata act ttc aca aac aac tgt cca aga	96	
Ser Gly Ala His Ser Ala Lys Ile Thr Phe Thr Asn Asn Cys Pro Arg		
20 25 30		
acc atc tgg cca gga acc cta act tcg gat caa aaa cct caa ctt tca	144	
Thr Ile Trp Pro Gly Thr Leu Thr Ser Asp Gln Lys Pro Gln Leu Ser		
35 40 45		
aaa act gga ttt gag tta gca tcc aaa gca tcc tta aca ttg gaa tgt	192	
Lys Thr Gly Phe Glu Leu Ala Ser Lys Ala Ser Leu Thr Leu Glu Cys		
50 55 60		
tca agc tcc atg gaa agg ccg gtt ttg ggc ccg aac ccg atg cac cac	240	
Ser Ser Met Glu Arg Pro Val Leu Gly Pro Asn Pro Met His His		
65 70 75 80		
caa atc agg aaa gtt cac ttg cga gac tgc tga ttg tag cac cgg tca	288	
Gln Ile Arg Lys Val His Leu Arg Asp Cys Leu His Arg Ser		
85 90		
ggg tgc atg caa tgg taa ccg tgc aat ccc acc agc ttc ttt agt aga	336	
Gly Cys Met Gln Trp Arg Cys Asn Pro Thr Ser Phe Phe Ser Arg		
95 100 105		
aat caa cat agc agc caa tcg tgg gat gga cta tta tga tgt tag cct	384	
Asn Gln His Ser Ser Gln Ser Trp Asp Gly Leu Leu Cys Pro		
110 115 120		
tgt aga tgg ctt caa ctt gcc tgg ttc tgt agc cac cag agg cgg cac	432	
Cys Arg Trp Leu Gln Leu Ala Cys Phe Cys Ser His Gln Arg Arg His		
125 130 135		
tgg tga ttg caa ggc cac aag ctg tcc agc taa tgt gaa cgc agt ttg	480	
Trp Leu Gln Gly His Lys Leu Ser Ser Cys Glu Arg Ser Leu		
140 145 150		
ccc agc gga att aca agt gaa agg gtc tga tgg gag cgt gct tgc ttg	528	
Pro Ser Gly Ile Thr Ser Glu Arg Val Trp Glu Arg Ala Cys Leu		
155 160 165		
caa gag cgc ttg tat tgc ttt caa tca acc aca gta ctg ttg cac tgg	576	

Gln	Glu	Arg	Leu	Tyr	Cys	Phe	Gln	Ser	Thr	Thr	Val	Leu	Leu	His	Trp	
170							175				180					
tgc	att	taa	cac	ccc	gaa	aac	atg	tcc	acc	cac	aaa	ata	ttc	tcg	cat	624
Cys	Ile															
185												190		195		
ctt	taa	gca	aca	atg	tcc	tca	agc	tta	tag	cta	tgc	tta	tga	tga	tcc	672
Leu																
200												205		210		
tac	cag	cac	ctt	tac	ctg	ctc	aag	tgc	acc	cga	cta	tgt	tat	cgc	att	720
Tyr	Gln	His	Leu	Tyr	Leu	Leu	Lys	Cys	Thr	Arg	Leu	Cys	Tyr	Arg	Ile	
215												220		225		
ttg	tcc	ata	aat													732
Leu	Ser	Ile	Asn													
230																
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1												10		15		
Ser	Gly	Ala	His	Ser	Ala	Lys	Ile	Thr	Phe	Thr	Asn	Asn	Cys	Pro	Arg	
20												25		30		
Thr	Ile	Trp	Pro	Gly	Thr	Leu	Thr	Ser	Asp	Gln	Lys	Pro	Gln	Leu	Ser	
												40		45		
Lys	Thr	Gly	Phe	Glu	Leu	Ala	Ser	Lys	Ala	Ser	Leu	Thr	Leu	Glu	Cys	
												55		60		
50																
Ser	Ser	Ser	Met	Glu	Arg	Pro	Val	Leu	Gly	Pro	Asn	Pro	Met	His	His	
65												75		80		
Gln	Ile	Arg	Lys	Val	His	Leu	Arg	Asp	Cys	His	Arg	Ser	Gly	Cys	Met	Gln
												85		90		
Trp	Arg	Cys	Asn	Pro	Thr	Ser	Phe	Phe	Ser	Arg	Asn	Gln	His	Ser	Ser	Gln

100

105

110

Ser Trp Asp Gly Leu Leu Pro Cys Arg Trp Leu Gln Leu Ala Cys Phe Cys
115 120 125 130

Ser His Gln Arg Arg His Trp Leu Gln GLY-His Lys Leu Ser Ser Cys Glu
135 140 145

Arg Ser Leu Pro Ser Gly Ile Thr Ser Glu Arg Val Trp Glu Arg Ala Cys
150 155 160 165

Leu Gln Glu Arg Leu Tyr Cys Phe Gln Ser Thr Thr Val Leu Leu His Trp
170 175 180

Cys Ile His Pro Glu Asn Met Ser Thr His Lys Ile Phe Ser His Leu Ala
185 190 195

Thr Met Ser Ser Ser Leu Ser Tyr Gln His Leu Tyr Leu Leu Lys Cys Thr
200 205 210 215

Arg Leu Cys Tyr Arg Ile Leu Ser Ile Asn
220 225